V. WHAT IS CLAIMED IS:

1. A method for analyzing data for different data types, comprising:

selecting a set of attributes associated with an object, the attributes selection from the group consisting of any of the text, numerical, categorical, or sequence data types;

transforming the selected attributes into n-dimensional vectors;

applying transformation operations to the selected attributes;

indexing the n-dimensional vector, certain attributes, and a result of the transformation operations; and

displaying a representation of the object based on the selected attributes.

2. A computer-implementing method of analyzing various data types, comprising the steps of:

defining a uniform data structure for representing objects of different data types;

segmenting certain attributes of a plurality of different objects of different data types into elements that are representable in said uniform data structure; and

operating on said certain attributes to produce at least one representation of said objects based on said uniform data structure.

3. The method of claim 2 wherein said plurality of different data types comprises a combination of any two of numeric, sequence string, categorical, or text data types.

LAW OFFICES
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

4. The method of claim 3 wherein said plurality of different data types comprise a combination of any three of numeric, reference string, categorical, in text data types.

5. The method of claim 4 wherein said data types comprise numeric, sequence string. categorical and text data types.

6. The method of claim 2 wherein said step of operating on said selected attributes produces a vector representation of said objects in correspondence with said uniform data structure.

7. The method of claim 2 further comprising producing an index that includes second representations of non-selected attributes of a particular object and associating the non-selected attributes with a particular representation of said first representations.

8. The method of claim 6 wherein said first and second representations are vector representations.

9. The method of claim 2 further comprising using a first set of said selected attributes associated with a first set of objects to determine the relationships among the first set of objects of a particular data type and using non-selected attributes associated with said first set of selected attributes to correlate objects represented by said first set of selected attributes with a second set of objects represented by a second set of selected attributes.

10. The method of claim 9 further comprising identifying, using said non-selected attributes, at least one object of said second set of objects that corresponds to a selected object or objects of said first set of objects.

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

11. The method of claim 10 further comprising displaying said first and second set of objects in first and second windows on a display screen and highlighting said second set of objects that corresponds to said selected object or objects.

12. The method of claim 2 wherein said step of segmenting comprises creating a plurality of said elements from a sequence of string sequence data.

13. The method of claim 12 wherein said step of segmenting comprises selecting words of a text document that meet certain preselected criteria.

14. The method of claim 2 further comprises using said first representation to identify cluster groups of related objects.

15. The method of claim 2 further comprising creating two dimensional projections of cluster groups for two dimensional visualizations.

16. A method of identifying relationships among different visualizations of data sets, comprising the steps of:

displaying first graphical results of a first type analysis performed on selected attributes of on a first set of objects;

displaying second graphical results of a second type analysis performed on selected attributes of a second set of objects;

selecting certain objects represented in said first graphical results; and

highlighting corresponding objects represented by said second graphical results that correspond to said certain objects.

17. The method of claim 16 wherein said step of highlighting is based on attributes not used for creating said first graphical results.

LAW OFFICES
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

18. The method of claim 17 wherein said first and second set of objects is the same.

19. A system for producing visualizations for various data types, comprising:

a first data processing engine operative to receive different types of data;

a second data processing engine operative to modify a first type of said data to conform said data to a standardized format that is used in identifying relationships among attributes of objects contained in said data; and

a third processing engine for creating a first high dimensional vector for a second type of data and for creating a second high dimensional vector for the modified data, each data type being an input into said engine, wherein said high dimensional vectors are operative to be compared to identify relationships that exist between the first and second data type.

20. A method of interactively displaying records and their corresponding attributes, comprising:

generating a first 2-D chart for a first record, wherein at least two attributes associated with the first record are shown along one axis, and wherein the values of the attributes are shown along the other axis;

receiving input from a user selecting the first record on the first 2-D chart;

analyzing an index to determine if the first record is shown in another view; and

LAW OFFICES
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

if the first record is shown in another view, altering the visual representation of the first record in the another view based on the user input.

21. The method of claim 20, wherein the first 2-D chart is a line chart.

22. The method of claim 20, wherein the first 2-D chart is a scatter chart.

23. The method of claim 20, wherein the user can select the scale of the axes.

24. The method of claim 20, wherein the another view comprises a galaxy view of groups of records.

25. The method of claim 20, further comprising generating a second 2-D chart for a second record, wherein at least two attributes associated with the second record are shown along one axis, and wherein the values of the attributes are shown along the other axis.

26. The method of claim 25, wherein the first 2-D chart is shown in a first color and the second 2-D chart is shown in a second color.

27. The method of claim 25 wherein the second 2-D chart is superimposed upon the first 2-D chart.

28. The method of claim 25, further comprising:

displaying text-based descriptions of the first and second records;

receiving input from the user selecting a text-based description; and

highlighting the 2-D chart of the record corresponding to the selected description.

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

29. The method of claim 25, further comprising:

displaying text-based descriptions of each attribute shown in the first and second 2-D charts;

receiving input from the user selecting a text-based description; and

highlighting the attributes and values in the 2-D chart that correspond to the description.

30. The method of claim 25, further comprising generating a third 2-D chart, wherein at least two attributes associated with the first and second records are shown along one axis, and wherein statistical values of the attributes are shown along the other axis.

31. The method of claim 30, wherein the statistical values comprise average values.

32. The method of claim 30, wherein the statistical values comprise median values.

33. The method of claim 20, further comprising displaying a text-based identification of the record selected by the user.

34. The method of claim 33, further comprising:

receiving input from a user pointing to a portion of the 2-D chart; and

displaying a text-based identification of the attribute and value corresponding to the pointed portion.

35. The method of claim 20, further comprising:

receiving input from a user selecting a record in another view;

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

analyzing an index to determine if the record is shown in the 2-D line chart; and

if the record is shown in the 2-D line chart, altering the visual representation of the record in the 2-D line chart.

36. A method of interactively displaying records and their corresponding attributes, comprising:

selecting a record and its associated attributes, wherein the associated attributes are any combination of numeric, categoric, sequence, and text information;

converting the associated attributes into numeric values; and

generating a 2-D chart for the record, wherein at least two attributes associated with the record are shown along one axis, and wherein the values of the attributes are shown along the other axis.

37. A method of interactively displaying records and their corresponding attributes, comprising:

generating a 2-D scatter chart that depicts a plurality of records;

generating a 2-D line chart for a group of records contained in a portion of the 2-D scatter chart, wherein at least two attributes associated with the group of records are shown along one axis, and wherein a statistical value for each of the at least two attributes is shown along the other axis; and

superimposing the 2-D line chart at a location on the 2-D scatter chart that is based on the location of the group of records on the 2-D scatter chart.

38. The method of claim 37, wherein the statistical value is an average value.

LAW OFFICES
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

39. The method of claim 37, wherein the statistical value is a median value.

40. The method of claim 37, wherein the portion is a quadrant.

41. The method of claim 37, wherein the portion is a cluster.

42. The method of claim 37, further comprising selecting a color for the 2-D line chart based on user-defined criteria.

43. The method of claim 37, further comprising selecting a size for the 2-D line chart based on user-defined criteria.

44. A method of interactively displaying records and their corresponding attributes, comprising:

selecting a set of records and their associated attributes, wherein the associated attributes are any combination of numeric, categoric, sequence, and text information;

converting the associated attributes into numeric values;

generating a first chart that depicts the set of records;

generating a second chart for a subset of records depicted in the first chart, wherein at least two attributes associated with the subset of records are shown along one axis, and wherein a statistical value for each of the at least two attributes is shown along the other axis; and

superimposing the second chart at a location on the first chart that is based on the location of the subset of records on the first chart.

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000

45. A method for visualization of multiple queries to a database, comprising:

selecting multiple queries to a database;

querying records in the database based on the multiple queries;

creating a query matrix indexed based on the selecting; and

populating the query matrix based on the querying.

46. A method according to claim 45, wherein selecting includes defining a query of an attribute of a record versus a record in the database.

47. A method according to claim 46, wherein the creating includes indexing the query matrix using a cluster corresponding to a plurality of records.

48. A method according to claim 47, wherein the populating includes statistically combining query results for the plurality of records corresponding to the cluster.

49. A method according to claim 45, wherein the selecting includes defining a query of a first attribute of a record versus a second attribute of a record.

50. A method according to claim 45, wherein the selecting includes defining a query of current data versus historical data.

51. A method according to claim 45, wherein the selecting includes defining a query of experimental data versus expert data.

52. A method according to claim 45, furthering including visualizing the populated query matrix.

53. A method according to claim 51, wherein the visualization includes creating a visualization matrix indexed based on the selecting, wherein the

LAW OFFICES
FINNEGAN, HENDERSON, FARABOW, GARRETT, & DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

visualization matrix is populated using a scale of color corresponding to values of the populated query matrix.

54. A method according to claim 53, further including:

detecting a user selection of a portion of the visualization matrix; and

displaying features of records in the database corresponding to the portion of the visualization matrix selected by the user.

55. An apparatus for visualization of multiple queries to a database, comprising:

an input device which permits a user to select multiple queries to a database;

an database tool to query records in the database based on the multiple queries;

a calculation device which creates a query matrix indexed based on the selecting and populates the query matrix based on the querying.

56. An apparatus according to claim 55, wherein the multiple queries include a query of an attribute of a record versus a record in the database.

57. An apparatus according to claim 56, wherein a cluster indexes the query matrix, a cluster including a plurality of records.

58. An apparatus according to claim 57, wherein query results for the plurality of records corresponding to the cluster are statistically combined.

59. An apparatus according to claim 55, wherein the multiple queries include a query of a first attribute of a record versus a second attribute of a record.

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D.C. 20005
202-408-4000

60. An apparatus according to claim 55, wherein the multiple queries include a query of a current data versus historical data.

61. An apparatus according to claim 55, wherein the multiple queries include a query of experimental data versus expert data.

62. An apparatus according to claim 55, furthering including a display that visualizes the populated query matrix.

Add A7

Add 62

LAW OFFICES
FINNEGAN, HENDERSON,
FARABOW, GARRETT,
& DUNNER, L.L.P.
1300 I STREET, N. W.
WASHINGTON, D. C. 20005
202-408-4000